



Schiess & Associates

ENGINEERING • PLANNING • LAND SURVEYING

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Department of Water Resources 07031/2.0
Eastern Region

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LETTER OF TRANSMITTAL

TO: IDNR

DATE: 8/9/07

900 N. SKYLINE DR.

Attention: ERNIE CARLSON

IDAHO FALLS, ID 83402

525-7161

We are sending you:

COPIES	DATE	DESCRIPTION
1	July '02	MINER'S DITCH WATER USAGE ENGINEERING, REPORT-DRAFT

THESE ARE TRANSMITTED as checked below:

- ☐ For approval ☐ Other as stated below
☐ For review and comment ☒ As Requested

REMARKS HELLO ERNIE, I'VE TABBED THE FOLLOWING SECTIONS THAT HELP JUSTIFY MORE THAN ONE INCH PER ACRE:

- EXISTING SURFACE RIGHTS FOR 446.3 INCHES - PAGE 1, & APPENDIX C
- NRCS LETTER ESTIMATING NEEDS FOR FLOOD IRRIGATION @ 1.5 inches/acre - APP. C
- FLOW MEASUREMENT SUMMARY ^{SHOWING} BED LOSSES - PAGE 6, PAGE 9

I WOULD LIKE TO COMPARE OUR MAPS WITH YOURS. WE CAME UP WITH 424.4 ^{IRRIGATED} ACRES WEST OF THE FREEWAY AFTER GOING OVER THE MAPS WITH MR. HINDERAGER YOUR OFFICE IS ONLY COMING UP WITH 282.3 ACRES.

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COPY TO _____

SIGNED

Marvin Falding

02015/7.2.

Miner's Ditch
Water Usage
Engineering Report

DRAFT

Project No. 02015
July 2002

Miner's Ditch Water Usage Engineering Report

Prepared for:
City of Blackfoot
157 N. Broadway
Blackfoot, ID, 83221

Prepared by:
David R. Schiess, PE
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7103 South 45th West
Idaho Falls, ID 83402

Project No. 02015
July 2002

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Miner's Ditch Water Usage

Engineering Report

1.0 Executive Summary

Schiess & Associates, Consulting Engineers was retained to conduct a study of the Miner's Ditch irrigation distribution system. This study was to include:

- A survey of the Miner's and Younie ditches including laterals,
- The acreage served by these two ditches,
- An estimation of expected transmission losses in these ditches,
- The amount of irrigation water currently being pumped in relation to the permitted amount given in the City's Permit to Appropriate Water No. 27-07577.
- Interviews with the persons and agencies involved to aid in conducting a valid study.

The survey of the channel alignment has been completed and superimposed on aerial photographs to help reference known landmarks. These aerial photos are included in Appendix A. The area served by the ditch has been outlined on the photos. The acreage of individual sections has been calculated and an indication given whether the section is flood irrigated or sprinkled. Table 1 below summarizes the type of irrigation, water rights, and permitted diversions for the acreage served by the two segments of Miner's Ditch. The table also summarizes what the City is currently supplying to these two segments. The City pumps water to the Younie Ditch and the Riverton Road segment of Miner's Ditch from the Blackfoot River. The City's Lansing Street well pumps water for the acreage west of the freeway.

Table 1

Location	Flooded Acreage	Sprinkled Acreage	Water Rights		Permit		Currently Pumping (cfs)
			inches	cfs	Acres	Flow	
Miner's - Lansing Street	326.5	97.9	446.3	8.9	364	7.28	11.4
Miner's - Riverton Road	99.3	90.8	313	6.3			5.6
Younie	117.2	0	156*	3.1			2.8
Totals	543	188.7	915.3	18.3	364	7.28	19.8

The Younie Ditch water right includes 4.5 inches of Geist water right. In addition to the 11.4 cfs being pumped from the Lansing Street well, Stanley Hill pumps 1.45 cfs from a shallow well to irrigate 43 acres at the end of the lateral west of the freeway.

Flow measurements of the channel supplied by the Lansing Street well show transmission losses that average 21 percent or 1100 gallons per minute between two measurement points approximately one-half mile apart. These losses may be localized or spread over this distance. If spread over this distance, this amounts to one half gallon per minute loss.

per linear foot of ditch. The ditch company should identify where these losses are occurring and take steps to mitigate them in order to better utilize the water being delivered to them by the City.

It appears that the application which the City's current permit is based on did not include all the acreage served by the Miners and Younie Ditches, nor did it include a request or justification for more than one miners inch per irrigated acre.

A new application should be filed with the Department of Water Resources for a service area of 732 acres with a total diversion of 18.3 cfs.

2.0 Introduction

The City of Blackfoot's Lansing Street well supplies irrigation water for 326 acres of flood irrigated farm ground and 98 acres of sprinkled farm ground east of Interstate 15 and south of the City's waste water treatment plant.

The City pumps water from the Blackfoot River to 216 acres of flood irrigated farm ground and 98 acres of sprinkled farm ground east of Interstate 15 and north of the Blackfoot River.

3.0 Channel Construction

Irrigation water for Miners ditch water users west of the freeway is delivered through one mile of earthen channel owned and maintained by the ditch company, and an additional 6200 feet of privately owned and maintained channel.

Irrigation water for users east of the freeway is delivered from the pump station on the Blackfoot River south of town, through a 3-foot diameter concrete pipe to a head gate structure at the intersection of Camas Street and Riverton Road. From this point it is delivered to users through 11,200 feet of ditch and laterals. Most of the channel is of earthen construction, however 1,320 feet has been piped underground. The ditch company owns and maintains 3,300 feet of the ditch.

Irrigation water for Younie ditch users is delivered to the outlet structures on Camas Street from the pump station on the river through underground concrete pipe. The Younie ditch consists of 1950 feet of concrete-formed channel, and 1100 feet of earthen channel.

4.0 Soils

The channel delivering water to users west of the freeway is constructed through soil classified by the Soil Conservation Service as Bock loam. This soil type typically has

more than 40 inches of moderately permeable soil over gravel. The soil profile as given in the soil survey of Bingham County is as follows:

- 0 to 15 inches - well-drained, loamy soil,
- 15 to 47 inches - mostly loam and fine sandy loam,
- Below 47 inches - very gravelly, coarse sand

Permeability in the upper 47 inches is 0.63 to 2.0 inches per hour. Permeability through the gravels found below 47 inches is more than 20 inches per hour.

The channel delivering water to users east of the freeway and south of Riverton Road is constructed in soils classified in the Bingham County soil survey as Blackfoot loam. This type is generally more than 60 inches of moderately permeable soil (0.63 to 2.0 inches per hour). There is seasonal high water at depths from 4 to 6 feet.

The earthen portion of the Younie ditch is also constructed in Blackfoot loam soils.

Soils in earthen channels tend to seal or cure over time lessening bed losses. This is the case with much of the Miner's Ditch, however, if the channel bottom is disturbed because of maintenance or other reasons, it will require time to cure again.

Expected losses for uncured channel in each type of soil is summarized in Table 2.

Soil Type	Permeability (in/hr)	Loss (gpm)/1000 ft
Black or Blackfoot Loam	0.63 - 2.0	65 - 200
Gravels	>20	>2000

Table 2.

As seen in the table, maintenance of the channel can create a concern for transmission losses. This is especially true if the channel conveys water with very low sediment loading as is the case with the Lansing Street well water.

Figure 1 below is the Soil conservation Survey's soil map of the areas served by the Miners and Younie ditches.

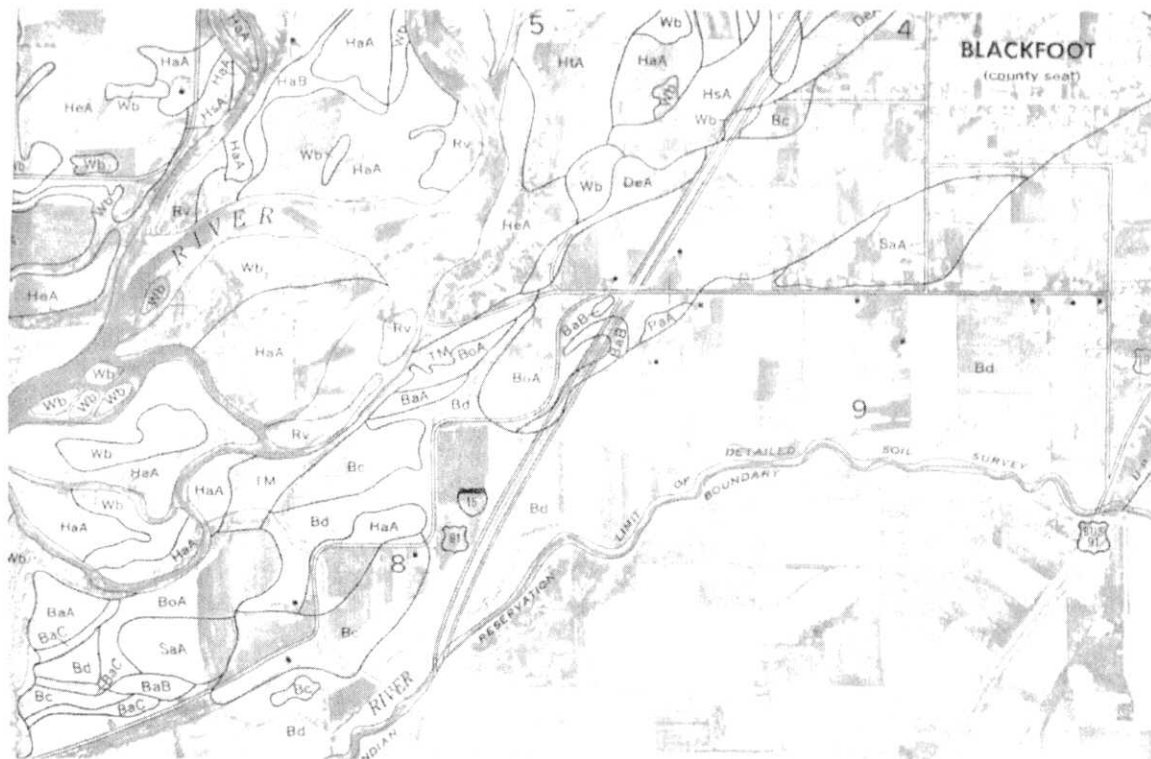


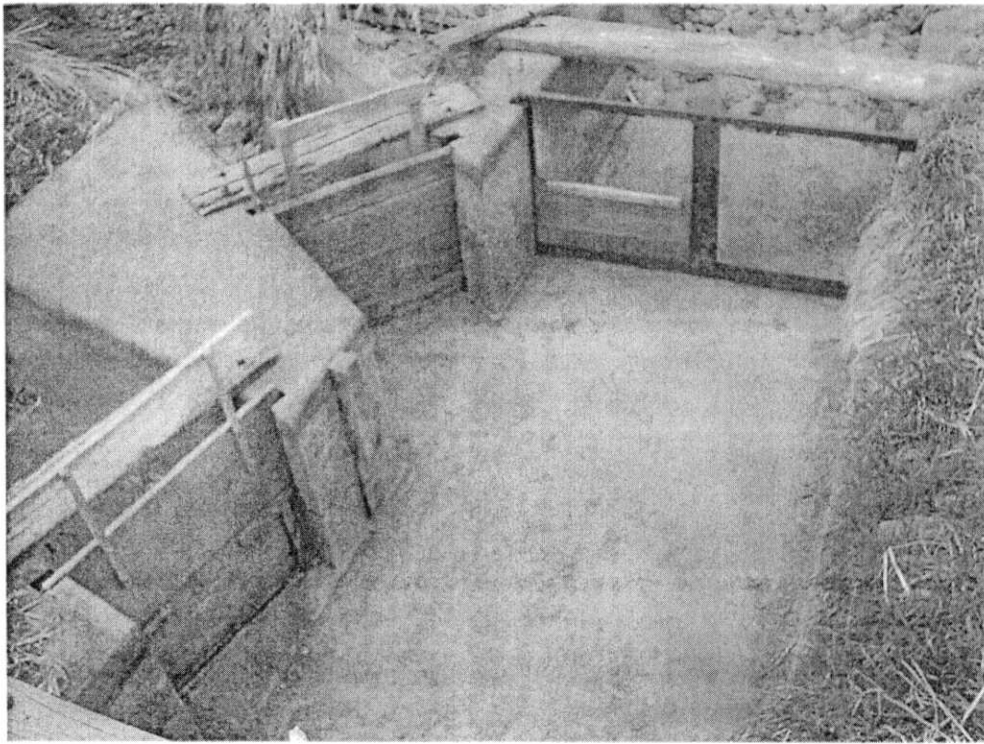
Figure 1 Soil Conservation Service Soil Map

5.0 Flow Measurement

Lansing Street Well Flows

Flow measurements for the portion of the ditch serving users west of the freeway were taken using the sharp-crested weirs at the diversion structure west of the freeway and at a contracted weir installed 2,340 feet upstream where the West Side ditch crosses over Miner's ditch.

Figures 2 and 3 show the weir arrangement at the diversion structure west of the freeway.



Figures 2 and 3 Flow diversion structure west of the freeway and 1000 feet upstream from the entrance to the treatment plant. (Below) Diversion structure flowing full.

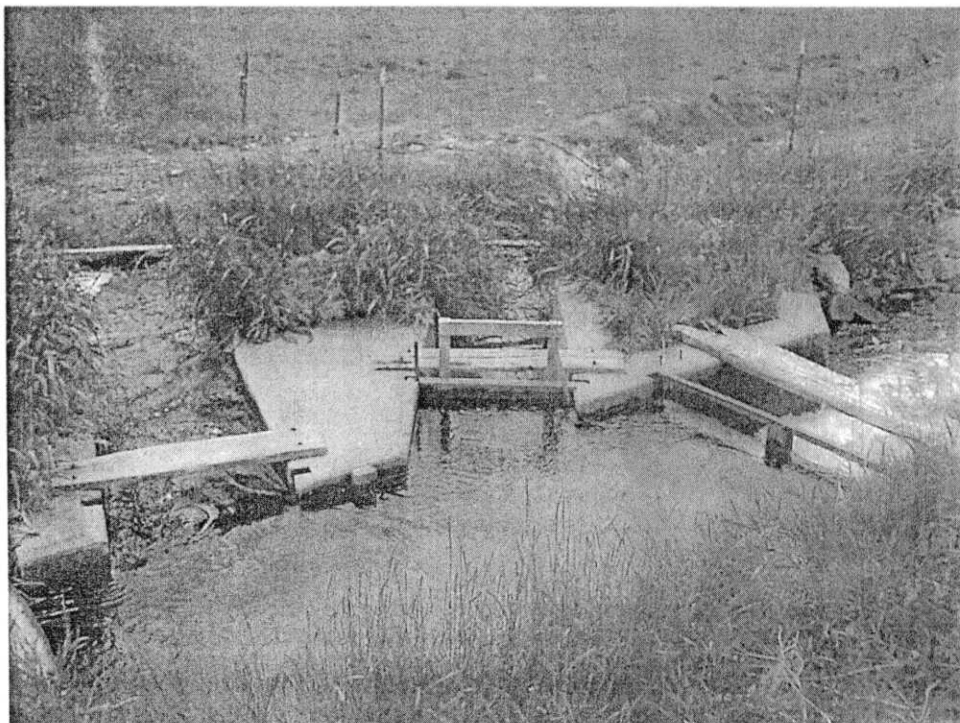


Figure 4 below shows the contracted weir installed at the West Side ditch spill structure.



Measurements were taken at times when the West Side ditch was not wasting to Miner's below the first weir. Checks were made to verify there were no other diversions being made between the two measurement points.

Table 3 below summarizes the flow measurement results.

Measurement Point	6/18/02	6/25/02	6/28/02
Contracted weir	6,175 gpm	5100 gpm	5039 gpm
Diversion structure	5,261 gpm	3795 gpm	3939 gpm
Losses	914 gpm	1305 gpm	1100 gpm

Table 3.

Riverton Road Flows

Total flows being pumped from the Blackfoot River were measured at the two main outlets: the Younie Ditch head gate, and the Riverton Road head gate. Smaller outlets were checked to verify no flow while measurements were being taken. Figure 5 below shows the weir where flows are measured at the Riverton Road head gate.



Figure 5 Weir installed downstream from the headgate on Riverton Road

Water level measurements were taken at a point just beyond the galvanized pipe on the left hand side of the channel. The point of measurement was referenced to the elevation of the top of the weir.

Measurements at the Younie ditch head gate were taken when water was only flowing to the concrete portion of the channel. Cross-sectional area was measured at a representative point of the trapezoidal channel. Velocity was measured by two different methods: by use of a magnetic flow meter inserted in the channel at the point the cross sectional area was measured, and by floating objects down a measured length of channel of which the measured cross section was a part. Velocities obtained by the two methods agreed very well.

Figure 6 below shows the section of the Younie ditch where velocities were obtained using the methods described above.



Figure 6 Younie Ditch west of Camas Street

Measurements taken June 18, 2002 showed a 900 gpm diversion at the Younie Ditch, and a 2,460 gpm diversion at the Miner's Ditch head gate on Riverton Road. This totals 3,360 gpm being pumped by a single pump from the Blackfoot River. Flow meter readings at the pump house next to the river were very erratic and appear to not be an accurate indication of what is being pumped.

There was no structure downstream suitable for installing a second weir so alternate methods were again used to obtain flow measurements. 470 feet before the ditch bends south and leaves Riverton Road, the ditch is routed underground through 185 feet of 24-inch pvc pipe. This pipe flows full. Objects were floated through this section of pipe to determine the average velocity of flow through the pipe. The flow meter was also used in this location as a second method of obtaining an average velocity.

Table 3 below summarizes the results of these measurements with relation to the readings taken at the weir upstream.

Miner's Ditch – Riverton Road Measurements		
Measurement Method	Average Velocity	Calculated Flow Rate
Weir		2500 gpm
Floating Objects	1.96 ft/s	2757 gpm
Flow meter	2.29 ft/s	3221 gpm

Table 3 Comparison of Measurement Methods – Riverton Road

As seen in the table, the downstream measurements, while comparable to the weir measurement, lack sufficient accuracy to be helpful in estimating bed losses. There were no diversions between the measurement points. There are also no points in between where other ditches can waste to this ditch.

To accurately determine bed losses in this portion of the Miner's Ditch, a second measurement structure should be built, preferably towards the end of the company-owned portion of the ditch before the ditch makes the bend south toward the river. The structure should incorporate the following features:

- Route all flow over a submerged weir
 - A submerged weir can be used to determine flow rates without greatly increasing the upstream water depth. This will help prevent channel washout.
- Provide for upstream and downstream water surface measurements with level reference to the top of the weir
- Have provision to prevent scouring of the channel immediately downstream from the weir

To ensure accurate measurements, all diversions between measurement points must be quantifiable, and flow must be given sufficient time to stabilize after a change in supply or in diversions.

6.0 Bed Loss Calculations

Measurements of the Miner's Ditch supplied by the Lansing Street well show average losses of 1100 gpm or 21 percent over 2,340 feet of ditch. 360 feet of this is in underground piping where the ditch crosses under the freeway. These losses could be occurring over this entire reach of ditch, or may be confined to a localized area.

Conversations with a local landowner raised the questions about the possibility of areas of exposed gravelly soils. There are patches of exposed gravel in the pastures to the south of the channel and east of the freeway. While irrigating these pastures, the landowner reported seeing the water "boil" as it infiltrated in these gravels. Infiltration is very rapid making these areas difficult to irrigate.

It is possible that these underlying gravels are exposed in sections of the ditch and that the losses we are seeing are localized. While these gravels should seal over time in a process known as curing, maintenance of the ditch may expose them again. The ground water being pumped contains very little silt to aid the curing process.

If these losses are local and can be located, the channel could be sealed with bentonite, or piped through the problem sections.

7.0 NRCS Recommendations

We have attached a letter from the USDA Natural Resources Conservation Service regarding the amount of water required to irrigate crops in this area. In summary, the

letter states one miner's inch per acre is adequate for sprinkler irrigation and may be adequate for flood irrigation depending on soil type and leveling. Their best estimate for water requirements based on soil type and historical usage is 1.5 inches per acre.

8.0 Water Rights

Miner's Ditch does not own any water rights. It is only a carrying ditch. Miner's Ditch users hold shares in various irrigation companies and other original water rights but receive their water through Miner's Ditch. These water rights include the following: East Idaho, Corbett Slough, Kirkpatrick, Fox & Whitten, Leon Mislin, Blackfoot Irrigation, Robert Millen, and James Welch. Appendix C contains a summary of the water rights in Miners Ditch obtained from Larry Hinderager, President of the Miners Ditch company.

Appendix A

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Aerial Photos

Cut Sections

Acreage Totals

MINER'S DITCH IRRIGATED ACRES

SOURCE: BLACKFOOT RIVER.

FLOODED

3.3
 19.2
 57.9
 2.2
 8.5
 8.2

 99.3

SPRINKLED

59.2

 31.6

 90.8

BLACKFOOT RIVER
 FLOODED

$$99.3 + 117.2 = 216.5$$

$$\text{SPRINKLED} = 90.8$$

$$\text{TOTAL} = 307.3 \text{ A}$$

YOUNIE DITCH IRRIGATED ACRES

SOURCE: BLACKFOOT RIVER

FLOODED

5.9
 111.3

 117.2

LANSING ST. WELL
 FLOODED

$$117.2 + 209.3 = 326.5$$

$$\text{SPRINKLED} = 97.9$$

$$\text{TOTAL} = 424.4 \text{ A}$$

MINER'S DITCH IRRIGATED ACRES

SOURCE: LANSING ST. WELL

FLOODED

70.6
 1.4
 1.5
 2.5
 7.1

 83.5

19.7
 24.5
 39.2
 42.8

 209.3

SPRINKLED

20.9 * NOT PREVIOUSLY IRRIGATED
 34.0
 35.9
 7.1

 97.9

Appendix B

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Measurement Locations & Procedure

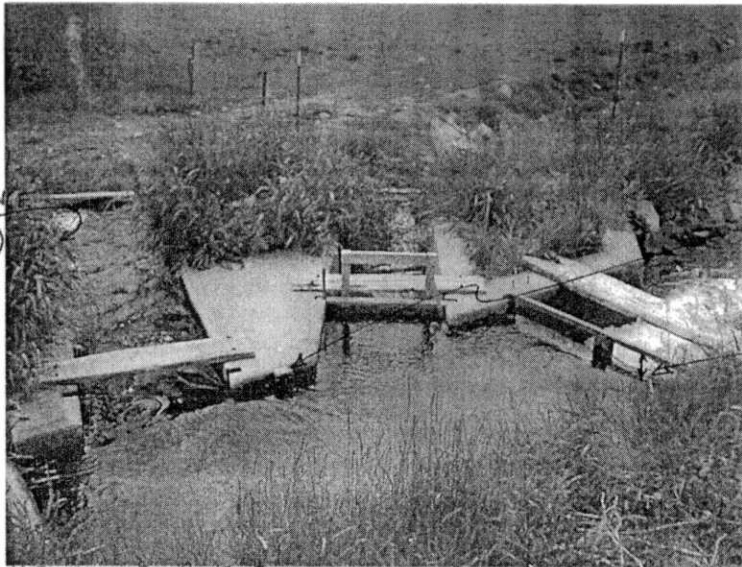
Weir Equations

Weir Dimensions

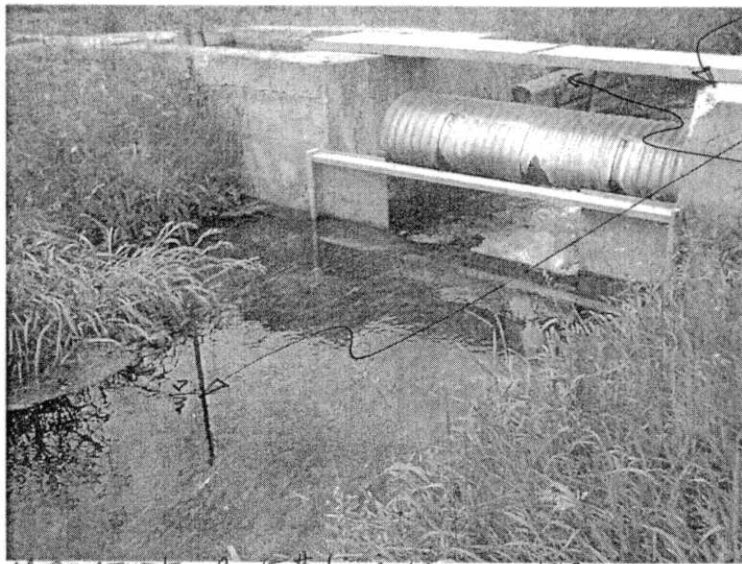
Flow Calculations

MINERS DITCH

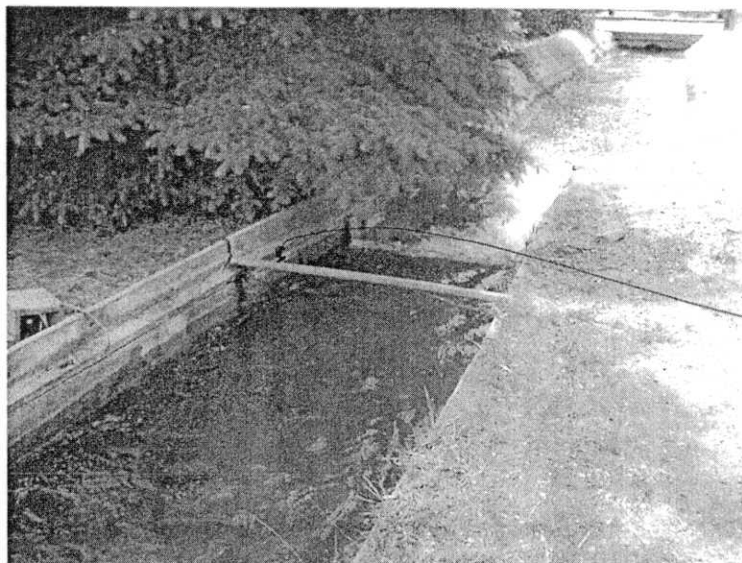
LANSING STREET MEASUREMENTS



MEASUREMENT POINT #5 DIVERSION STRUCTURE



MEASUREMENT POINT #4 - CONTRACTED WEIR



MEASUREMENT POINT #1 - RIVERTON ROAD $\perp$ CAMAS ST.

1.) MEASURE DISTANCE FROM TOP NOTCH ON BOARD TO WATER SURFACE.

2.) MEASURE DISTANCE FROM BOTTOM OF ANGLE IRON TO TOP OF NORTH WEIR. ALSO NOTE IF WATER IS LEAKING BETWEEN BOARDS.

4.) TAKE A1 READING ON STAKE.

5.) MEASURE DISTANCE FROM TOP OF T-POST TO WATER SURFACE.

6.) VERIFY WEST SIDE DITCH IS NOT WASTING TO MINER'S

7.) VERIFY NO DIVERSIONS BETWEEN MEASUREMENT POINTS.

8.) IS WEST SIDE WASTING TO MINER'S AT LANSING ST.?

9.) IS YOUNIE WASTING TO MINER'S?

10.) CALL LARRY HINDERAGER OR CHARLIE HOSKINS TO VERIFY DIVERSIONS BETWEEN CHECK POINTS.

LARRY H: 681-9234 or 785-0360

CHARLIE H: 785-6221

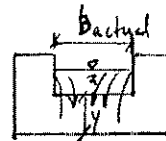
RIVERTON ROAD MEASUREMENTS

1. MEASURE FROM BLACK MARK TO WATER SURFACE

THE FOLLOWING WEIR EQUATIONS WERE USED IN CALCULATING FLOWS IN THIS STUDY:

$$Q = \frac{2}{3} (C_1) b_{eff} \sqrt{2g} \left[\left(H + \frac{V_1^2}{2g} \right)^{\frac{3}{2}} - \left(\frac{V_1^2}{2g} \right)^{\frac{3}{2}} \right]$$

WHERE: Q = FLOW (cfs)
 g = 32.2 ft/s²
 V_1 = VELOCITY AT THE POINT WHERE H IS MEASURED
 H = SEE FIGURE (feet)
 y = SEE FIGURE (feet)



C_1 DEVELOPED BY REHBOCK

$$= \left[0.6035 + 0.083 \left(\frac{H}{y} \right) + \frac{0.000295}{y} \right] \left[1 + \frac{0.00361}{H} \right]^{\frac{3}{2}}$$

IF THE WEIR OPENING IS SMALLER THAN THE WIDTH OF THE CHANNEL, ADJUST b :

$$b_{effective} = b_{actual} - (0.1)(N)(H)$$

$N=0$ IF WEIR WIDTH IS SAME AS CHANNEL WIDTH

$N=1$ IF ONE SIDE IS CONTRACTED

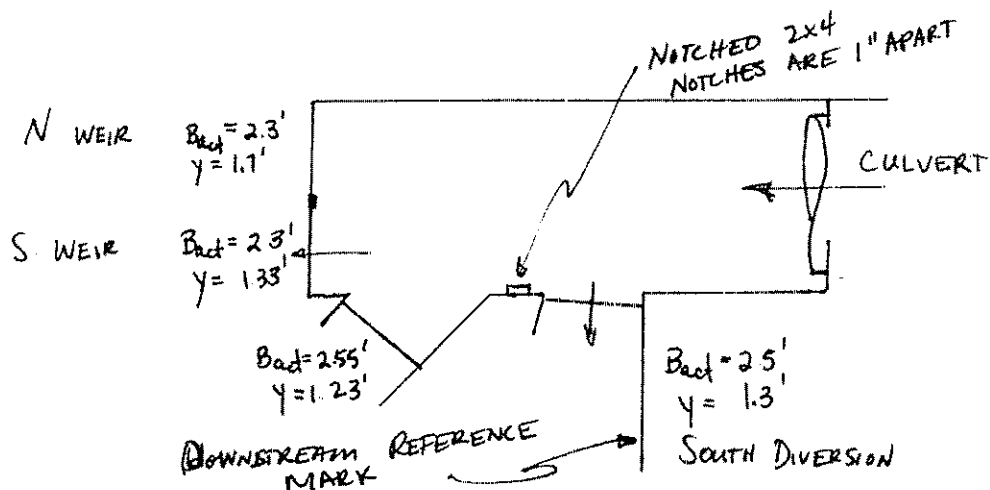
$N=2$ IF BOTH SIDES ARE CONTRACTED

SUBMERGED WEIR EQUATION:



$$Q_{submerged} = Q_{FREEFLOW} \left[1 - \left(\frac{H_{downstream}}{H_{upstream}} \right)^{\frac{3}{2}} \right]^{0.385}$$

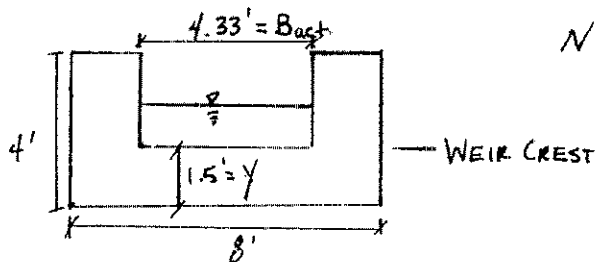
DIVERSION STRUCTURE



- TOP NOTCH OF 2x4 IS 1.15' ABOVE S WEIR CREST. READ WATER LEVEL IN NUMBER OF NOTCHES BELOW THE TOP NOTCH, CONVERT TO FEET AND SUBTRACT FROM 1.15' TO GET $H_{upstream}$. THIS WEIR ONLY REQUIRES AN UPSTREAM MEASUREMENT SINCE THE WEIR IS NOT SUBMERGED.
- ESTIMATE LEAKS THROUGH N WEIR. - USUALLY LESS THAN 100 gpm.
- TOP NOTCH OF 2x4 IS 1.14' ABOVE SOUTH DIVERSION WEIR CREST. CONVERT WATER SURFACE READING ON 2x4 TO FEET AND SUBTRACT FROM 1.14' TO GET $H_{upstream}$.
- DOWNSTREAM REFERENCE MARK IS 1.14' ABOVE THE SOUTH DIVERSION WEIR CREST. MEASURE FROM THE MARK TO THE WATER SURFACE, CONVERT TO FEET AND SUBTRACT FROM 1.14' TO GET $h_{downstream}$.

CONTRACTED WEIR

LOCATION: INSTALLED AT CONCRETE STRUCTURE WHERE WEST SIDE DITCH CROSSES MINER'S DITCH MIDPOINT BETWEEN LANSING STREET WELL AND FREEWAY.



$N = \# \text{ OF CONTRACTIONS} = 2$

H_{UPSTREAM} :

2.25' ON THE STAKE IN THE CHANNEL UPSTREAM FROM THE WEIR IS LEVEL WITH THE WEIR CREST. UPSTREAM WATER SURFACE MEASUREMENTS ARE READ OFF THE STAKE AND SUBTRACTED FROM 2.25'

• THE WEIR IS $\frac{1}{2}$ " OFF LEVEL ACROSS THE 4.33' OPENING. SUBTRACT 0.02' FROM H_{UPSTREAM}

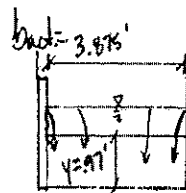
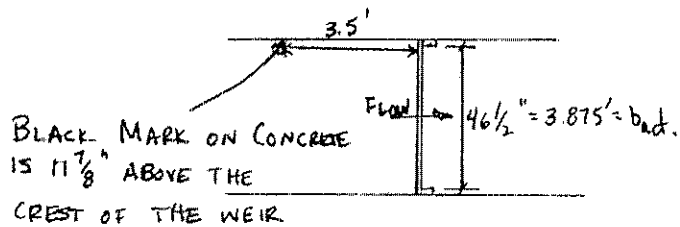
$h_{\text{DOWNSTREAM}}$:

THE TOP OF THE T-POST DOWNSTREAM FROM THE WEIR IS 35.25" ABOVE THE WEIR CREST. THE AVERAGE WATER SURFACE LEVEL IS MEASURED FROM THE TOP OF THE T-POST AND SUBTRACTED FROM 35.25" AND CONVERTED TO FEET.

RIVERTON ROAD WEIR

LOCATION:

JUST BELOW HEADGATE AT THE INTERSECTION OF CAMAS ST.
AND RIVERTON ROAD.



$N = \# \text{ OF CONTRACTIONS}$
 $= 2$

H: MEASURE FROM THE MARK TO THE AVERAGE WATER SURFACE,
SUBTRACT FROM 11.875 (11 7/8") AND DIVIDE BY 12 TO CONVERT
READING TO FEET.

JUNE 25, 2002

LANSING ST. SUPPLY

16:14 NO WEST SIDE WASTE AT LANSING ST. WELL

16:20 Scale upstream = 1.33 Weir = 2.25

$$H_{up} = 2.25 \cdot 1.33 = .92' \quad H_{up, CORRECTED FOR LEVEL} = .90'$$

$$h_{down} = 35.25'' - 30.75'' = 4.5'' = .375'$$

$$V \approx 0.5 \text{ ft/sec.}$$

$$b_{act} = 4.33 \quad h_{eff} = 4.15$$

- NO WEST SIDE WASTE BELOW WEIR

$$Q_{ff, cont} = 12.51 \text{ cfs} = 5618 \text{ gpm.}$$

$$Q_{sub} = Q_{ff, cont} \left[1 - \left(\frac{h}{H_T} \right)^{1.5} \right]^{0.385}$$

$$= 5618 \left[1 - \left(\frac{.375}{.90} \right)^{1.5} \right]^{0.385}$$

$$= \underline{5101 \text{ gpm}}$$

16:34 20 gpm lost through N. weir, NO FLOW OVER
- NO DIVERSIONS BETWEEN

S. WEIR

$$\text{Water surface} = 5'' \text{ below top notch} = 4.17'$$

$$H = .73'$$

$$Q = 4.73 \text{ cfs} = \underline{2123 \text{ gpm}}$$

S. DIVERSION

Check against Pauls Thesis

$$1.14 - 7\frac{3}{8}'' = 1.14' - 6.56' = 484'' = h_{down}$$

$$H_{up} = 1.14 - 5/12 = .72'$$

$$Q_{ff, cont} = 5.07 \text{ cfs} = 2276 \text{ gpm}$$

$$Q_{submerged} = 1973 - 1672 \text{ gpm} \quad \nabla$$

correction factor = 73%

TOTAL = 3195 gpm
AT DIVERSION STRUCTURE

N. RACTED
WEIR

DIVERSION
STRUCTURE

JUNE 28, 2002

LANSING ST. SUPPLY

13:46 ESTIMATED 100 gpm LEAKING TO MINER'S FROM WEST SIDE
SPILL GATE BEHIND CONTRACTED WEIR.

SCALE UPSTREAM = 1.27
T-POST TO WATER SURFACE = 28 1/2" avg weir height = 2.23'

$H_{upstream} = 2.23 - 1.27 = .96'$ $y = 1.5 \text{ Feet}$

$h_{downstream} = 35.25 - 28.5 = 6.75" = .56'$

$V_1 \approx 0.5 \text{ ft/s.}$

$b_{act} = 4.33'$ $b_{cfs} = 4.15'$

$Q_{sub,cont} = 100 + 4939 = \underline{\underline{5039 \text{ gpm.}}}$

13:40 Water Surface = 4.25" DOWN FROM TOP NOTCH

S. DIVERSION WEIR = 7"

4 PENCIL-SIZED LEAKS THROUGH N. CHECK, BUT
NO FLOW OVER THE TOP.

$4.25" = .35'$

$1.15 - .35 = .8 \text{ H}_{South \text{ Weir}}$

$1.14 - .35 = .79 \text{ H}_{S. \text{ diversion}}$

$h_{down} = 1.14 - 7/12' = .56'$

S. DIVERSION $Q_{sub,cont} = 1457 \text{ gpm}$

S. Weir $Q_{ff} = 2432 \text{ gpm}$

Leaks &c EST. 50 gpm

$\underline{\underline{3939 \text{ gpm}}}$

Appendix C

Index

Permit to Appropriate Water

Miners Ditch Water Rights

NRCS Letter

Ditch Company Contact List

State of Idaho
Department of Water Resources

Permit To Appropriate Water

NO. 27-07577

02015/33

RECEIVED

JUN 24 1998

Department of Water Resources
Eastern Region

Proposed Priority: July 1, 1996

Maximum Diversion Rate:

7.28 CFS

This is to certify, that CITY OF BLACKFOOT
157 N BROADWAY
BLACKFOOT ID 83221

has applied for a permit to appropriate water from: GROUNDWATER

and a permit is APPROVED for development of water as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>
IRRIGATION	04/01 to 10/31	7.28 CFS

LOCATION OF POINT(S) OF DIVERSION:

NWSE , Sec. 4, Township 03S, Range 35E
BINGHAM County

PLACE OF USE: IRRIGATION

<u>TWN</u>	<u>RGE</u>	<u>SEC</u>	<u>ACRES</u>	<u>ACRES</u>	<u>ACRES</u>	<u>TOTAL</u>
03S	35E	5	SWSE 34.0	SESE 28.0		62.0
		7	NESE 32.0	NWSE 9.0	SWSE 9.0	
			SESE 10.0			60.0
		8	NENE 22.0	NWNE 34.0	SWNE 20.0	
			SWNW 30.0	SENE 36.0	NESW 27.0	
			NWSW 38.0	SESW 5.0	NWSE 5.0	
			SWSE 25.0			242.0

Total number of acres irrigated:

364.0

CONDITIONS OF APPROVAL AND REMARKS

1. Proof of construction of works and application of water to beneficial use shall be submitted on or before July 1, 2000.
2. Subject to all prior water rights.
3. Prior to diversion of water under this right, the right holder shall install and maintain a measuring device and lockable controlling works of a type acceptable to the Department as part of the diverting works.
4. Diversion of water under this right shall be used to supply share holders of the East Idaho, Corbett Slough, and Blackfoot Irrigation canal companies diverting water from the Miner Ditch. Miner Ditch users will allow their surface water shares to continue down the Snake River as mitigation to offset the use of groundwater under this right.
5. The point of diversion is known as the Lansing Street well.
6. Use of water under this right will be regulated by watermasters of State Water Districts Nos. 01 and 27.

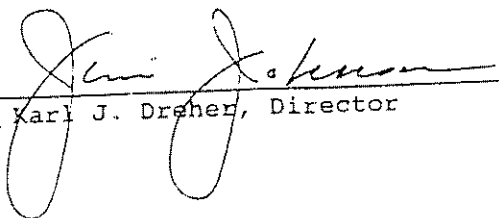
State of Idaho
Department of Water Resources

Permit To Appropriate Water

NO. 27-07577

This permit is issued pursuant to the provisions of Section 42-204, Idaho Code.
Witness the signature of the Director, affixed at Boise, this

17TH day of June, 1998.


for Karl J. Dreher, Director

12
DIRY

Idaho Department of Water Resources
Water Rights Screen 4

Date: 05/02/01
Time: 09:26:05

Right Number: 27-07577

Age/Status : P/	Temporary Right : P	Region : 15
Water District: 27	Swan Falls Flag :	Field Exam :
U Owned : Y	Transfer/Amended:	DLE Carey Act :
A Descrip. :		Presumption Flag:

Priority : 7/ 1/1996	Appl. Rec. : 7/ 1/1996	Appr/Deny : 6/17/1998
o f Due : 7/ 1/2000	Proof Made: 6/ 5/2000	Field Exam: / /
a to SO: / /	Protested : / /	Hearing : / /
ow Cause: / /	Licensed : / /	Decree : / /

cript No.: E022336

Old Number:

vil Case No.:
fendent:
a ntiff:

nter=Exit)

(GOLD8=Cancel)

MINER'S DITCH WATER RIGHTS

NAME	TOTAL	WATER RIGHTS, INCHES								
		East Idaho	Corbett Slough	Kirkpatrick	Fox Whitten	Leon Mislin	John Mislin	Blackfoot Irrig.	Robert Millen	James Welch
Empey	2.5			2.5						
McNutt	1.0			1.0						
Hoge/Ellsworth	36.5			36.5						
Kirkpatrick	5.0			5.0						
Lilya	5.0			5.0						
Collard	20.0				20.0					
Dechant	50.0			50.0						
Hinderager	72.0		22.0					50.0		
Hamilton	121.0		74.0		35.0	12.0				
Sub-total:	313.0	0.0	96.0	100.0	55.0	12.0	0.0	50.0	0.0	0.0
Bergeman, Ed	2.5	2.5								
Bergeman, David	2.0	2.0								
Christensen	1.5	1.5								
Petersen	1.0	1.0								
Smith	80.0	51.0			15.0					14.0
Hinderager	142.0	100.0	42.0							
Hill	77.7				24.0				41.7	12.0
Stokes	21.3		21.3							
Cushman	12.0		12.0							
Lindsey	53.5		10.0						43.5	
Mickelson	21.0		21.0							
Colson	5.0								5.0	
Haddon	4.0								4.0	
Bingham	5.0								5.0	
Carson	12.0	12.0								
Ellefson	5.8								5.8	
Sub total:	446.3	170.0	106.3	0.0	39.0	0.0	0.0	0.0	105.0	26.0
Younie Ditch	151.5					31.5	120.0			
Giest	4.5					4.5				
GRANDTOTAL:	915.3	170.0	202.3	100.0	94.0	48.0	120.0	50.0	105.0	26.0
% of Total Water Rights:	100.0%	18.6%	22.1%	10.9%	10.3%	5.2%	13.1%	5.5%	11.5%	2.8%

DITCH BRANCH	% OF TOTAL
Riverton Road	34.2%
West of Freeway	48.8%
Younie	16.6%
Giest	0.5%
Total:	100.0%

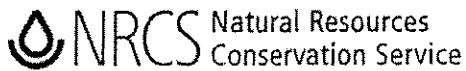
DATES OF WATER RIGHTS

Leon Misslen	1873 & 1885
John Misslen	1874
Kirkpatrick	1878
Eastern Idaho	1880 & 1885 (64% & 36%)
Robert Millen	1885
Fox & Whitten	1885
James Welch	1886
Corbett Slough	(Snake River Water)
Blackfoot Irrig	(Snake River Water)

Note: This list is very close but it is not claimed to be exact. There are a few small users (lawns & gardens) on the east side of freeway that are not listed and some of the numbers may be slightly off.

02015/3.0

United States Department of Agriculture



725 Jensen Grove Drive
Blackfoot, ID 83221

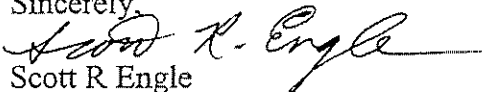
May 13, 2002

Mr. Marvin Fielding
Schiess and Associates
7103 South 45th West
Idaho Falls, ID 83402

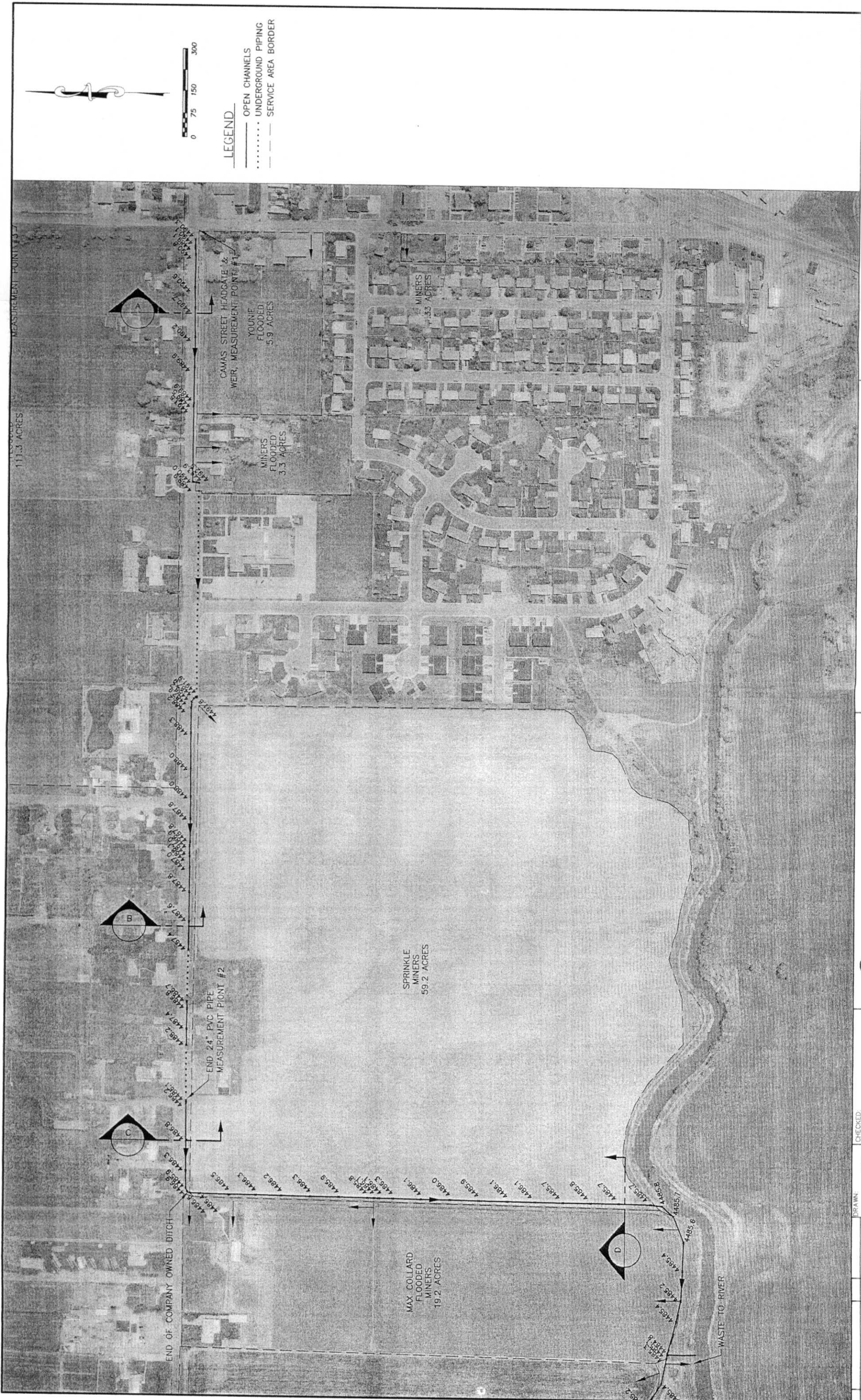
Dear Mr. Fielding:

You requested our office to determine the amount of irrigation water needed per acre to flood irrigate grass pastures and hay in the area around the town of Blackfoot. The general figure of one miners inch per acre works well and even provides excess water when ground water is pumped out of a well directly into a sprinkler system. In many cases, one miners inch per acre will even irrigate well leveled flood irrigated fields. However, the unknown is the losses through the irrigation ditches transporting the water to the farms. Therefore, we can not give you an exact figure on how much water is needed. Figures we have gathered on water rights near this area indicate that 1.5 miners inches per acre were used when the land was flood irrigated. This is our best estimate of the water needs at this time, though this may vary by soils and the leveling of the fields.

Sincerely,


Scott R Engle
District Conservationist

Ditch & Location	Names of Board Members & Ditchriders	Phone number
Blackfoot Water Master	John Davidson	346-6717
Idaho Water Resources Board	Ron Carlson	525-7161
Blackfoot Irrigation System	Jay Mortensen	785-3094
Corbet Slough starts N. of Wapello, crosses Hwy 91 by Mangum's, travels south past Tanner Ln, Rich Ln. by Mtn View Estates, up Mitchell thru SHS, to Cromwell & into Blkft River	Roger Yerke (ditchrider) Robert Olsen (pres) Walter Yerke Candy High (sec)	785-6796 785-0467 785-1989 785-7296
Dipple Ditch N. of Fairgrounds, ends up by Keslers, then N. on Meridian to river	David Tanner	785-1450 (w) 785-2951 (h)
Fisher Lateral	Lowell Dance Ludell Evans	785-0763 785-2881
Groveland Sewer & Water District	Michelle Rhea (sec)	785-0320
Little Butte Canal starts at diversion, across Cromwell, Seefried & Hepworth then underground	Neil Hepworth (pres) Robert Evans (ditchrider)	785-3119 681-0872
Minor's Ditch starts at Blkft River to LDS South Stake Center then down Riverton Rd.	Larry Hinderager (ditch mstr) Elouise Hamilton (sec)	785-0360 785-3282
Twin Buttes Canal		
West Side Ditch Block west of Mini Barn, thru town to Kirby, Elm, Center St, then Lansing	Kirk Thurman	785-0895
Younie's Ditch runs from West Riverton Rd. to Meridian & McAdoo, then to east side-Rice, Sumac, Golden, Topaz	Alan Bench (pres) Donna Bishoff (sec) Jim Bischoff (vice) Keith Murray Robert Sims	785-6492 785-4835 785-4835 785-1764 785-1434



LEGEND

- OPEN CHANNELS
- UNDERGROUND PIPING
- - - SERVICE AREA BORDER

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CAD NAME: 02015										HORZ. SCALE: 1"=300'																																							
VERT. SCALE: N/A																														MINER'S DITCH										SHEET NO. 1									
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LEGEND
—— OPEN CHANNELS
..... UNDERGROUND PIPING
--- SERVICE AREA BORDER



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LEGEND
— OPEN CHANNELS
- - - UNDERGROUND PIPING
--- SERVICE AREA BORDER

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DESIGNED: _____				MF		APPROVED: _____			
CAD NAME: _____				02015		HORIZ. SCALE: 1"=300'			
						VERT. SCALE: N/A			

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LEGEND

- OPEN CHANNEL
- UNDERGROUND PIPING
- SERVICE AREA BORDER
- CHANNEL INVERT

DRAWN		TRM	CHECKED	MF
DESIGNED		MF	APPROVED	MF
CAD NAME		02015	HORIZ. SCALE: 1"=300'	
NO. REVISIONS		BY	DATE	11/14
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**CITY OF
BLACKFOOT**

DITCH CROSS SECTIONS

PROJECT NO.

02015

SHEET NO.

XS-1